Solar Physics, Astrophysics, and Astronomy

7710 COCOMA

POSSIBLE ORSERVATION OF A DISCONNECTED MATNETIC STRUCTIONS ILL A CORONAL TRANSLONT

R. 9. E. 111 Ing and A. J. Hundhausen Linge Altirude
Offservations, National Center for Almosoberic Research,

P.O. Box 1960, Spulfer, Colorado, 8930()

Me present SM4 Commangreph/PolarineNer observations
of the boronal treatent of 18-16 first, 1989, which
shows a height fromt bonvox lower in your propagating
out through the corona at 174 has see? A foom shaped
bright region commenting this front to the inner Corona
collapses into e marrow bright ray over the next few
nors. We interpret those observations as resulting hours. We interpret thate observations as resulting from the distrometion of magnetic longs from the mistonnetion of magnetic longs from the underlying prominence-like long structures seen rising earlier in the event. Other similar "inverted arches" exist in the E/P date, but ere usually seen with poorer longoral resolution.

J. Coophys. Res., Bluz. Paper 3A1447

7720 Electromagnathr Radistion
PIFFEELCER IN THE TEMPORAL VARIATIONS OF BOLAR UV
FULX, [07, ca Solar Radio flux, SEEBOD NUMBER AND CS-K
FLAGE DATA CAUSED BY SOLAR ROTATION ASD ACTIVE REGIDM

SVOLUTION R. F. Donnally (hOAA ERL ARL, Souldar, Colorado SCIDI), D. Y. Heeth, J. L. Lean, and G. J. Rotteen

Tao types of temporal vaciations to the solar SV Spactcel irradiance, caused by solar rotation and sative rayion evolution, are presented and discussed, Those patticular UV vaciations differ markely from the mative raylon evolution, are presented and discussed. These particular UV weelstloop differ sarkedly from the roorucrant vectations in the 10.7 cs radio flue and sumper under to the contract of the same sumper under the contract of the same sumper under the contract of the same sumper under the contract of the same parallel to the observed. We flue, The first type of dissiplier temporal behavior carries under concentrations of salar series raylong the same series and the same series of the same series and the same series of the same series and the same of the contract of the same series and the same of the contract of the same series and the same of the contract of the same series and same series and the same series and same series and

J. Geophys. Res. , Blue, Paper 3A1463 7740 Magnatic Fields (Heliospheric Current Sheet) THE STRUCTURE OF THE HELIOSPHERIC CURRENT SHEET: 1978-

192
J. Todd Rookers (Elactronic Research Lebrustories [128)
Stanford University, Stanford, California, \$4305), John
M. Milcox and Philip H. Scherzer
The structure of the helicapharic separatio flaid
changes substantially during the 11 year sumeport dyels.
We have calculated the configuration for the partial
1976 through 1982 using a potential field sofel, contiming our section study man, solar shalmes in 19761977 (Stockaste et al. 1982). In this paper we concerntrate or the etrocust during the rising phase, servines,
and early decline of summer that four worse, in the
Early in this interval Chart size four worse, in the

Vol. 64, No. 40, Pages 577-584

current sheet (the boundary between interplanotary mag-netic field (DF) toward and eway from the Sun) giving time to a four-sector structure in the DF observed of Earth. The location of the current sheet changes slow-ly and astends to a beliographic latitude of approxi-nately 50°. Near maximum the structure is much sorre complace with the current sheet estanding nearly to the roles. Often there are multiple current sheets. As solar activity decreases the structure simplifies until, in most of 1982, there is a single, simply shaped cur-rent sheet corresponding to a two-sector DF structure in the scriptic plane.

Tectonophysics

BIGG General PREF-SEATED FLOW AS A MECHANISM FOR THE UPCLIFF OF BROAD FOREARC SIGGES AND ITS BOCK IN THE EXPOSURE OF HIGH P/T

slops breaks [the proress casponelble for eplift is our urring within the subduction coupies, and the size of the accessed case is apparently a major fartor. Sheelogias! models asseming frictional midding laws at shullou lawsis and power law theologias at depth predict different behaviors for various pacts of a "typical" large subduction comples. The older forears

bassaon) become whice the tuboard part of the subjurtion romplex is contacted represents a right-hrittle meanly that extends 160-150 in less the volvenir orr, a prediction comported by saintiffy studies to modern convergent margine. Seement compleme, because it thinloging of the subjurtion compleme, however, the brittle-to-ductifs treathy opparently errory at dopths of 10-20 is wight opparently errory at dopths of 10-20 is wight and whore the damas. Thus to large subjurtion temperature where the design of the subjurtion complement of the design of the subjurtion complement and the subjurtion complements in the subjurtion that the contact of the subjurtion complement of the subjurtion complements to the subjurtion that the subjurtion complement is opparently supplied that the subjurtion complement is the subjurtion complement.

October 4, 19

Ocean Sciences Meeting January 23-27, 1984 New Orleans, Louisland ABSTRACT DEADLINE OCTOBER 19, OCTOBER 19, 1983

was published in Eps. April 5 and July 5 Preregistration Deadline January 6, 1984 Registration and housing information was published in Eos. August 2 For more information, write:

AGU Ocean Sciences Meeting 2000 Florida Avenue, N.W. Washington, DC 20009 or call AGU Meetings Department. 202-462-6903

WEEKS

ews

Energy and Air Ouality (

Many coal, od shale, and geothermal enerw sources are located in areas where atmopletic transport and dispersion processes redominated by the complexity of the terpin. The U.S. Department of Energy (DOE), responsible for developing new energy tech-gologies that meet air-quality regulations, sleseloped a program aimed specifically at At-momberic Studies in Complex Terrain (AScoll in 1978. The program uses theoretical amospheric physics research, marliematical models, field experiments, and physical madels. The goal is to slevelop a modeling and measurement methodology to (1) improve fundamental knowledge of transpart and disperson processes in complex terrain and (2) build on this improvement to provide a methadology for performing air quality assessments. The ASCOT team, managed by Marin Ockerson and Paul Cardiksen al Lawsence Livermore Laboratory, Livermore, Call, is composed of scientists from DOF. supported research laboratories and universi-

The initial ASCOT study site, the Geysers enhermal area in northern California, was desen for the following reasons: (1) The electrical power generating capacity of the Gyen is undergoing extensive expansion and the impact of this development requires father air quality assessment. [2] Power plant cooling towers and genthermal wells tocard on the mountain ridges and slopes and malleys release a variety of emissions such a carbon dioxide, hydrogen sulfale, methme ammonia, radou gas, arsenie, burie acid, mercury, and other trace manerials. A current gavironmental issue is the release of liviliagestuffide and its transport to surrounding communities and agricultural areas. (3) Nocturnal drainage winds and symptic-mesowale sinds can transport the Geysers ellineans into othervalleys. (4) Conjugation and interest washowo by state and local governments and by industry. (5) There is a data base on

the area's air quality and meterolology.

The ASCOT multipliconate by program conbuild intensive liebl measurement programs inte Anderson Springs-Purah Greek area of the Geysers during July 14-28, 1979, and September 11-25, 1980. For using on the rule that nocturnal dealinage winds play in transporting and dispersing potential ellinems to the sucrounding areas, the studies were divided into meteorological measurements and lister experiments,

Aftird field experiment was combacted uring August 12-24, 1481, in the Big Sullin Creek area of the Geysers and Anderson-Putab-Cobb ralley areas. Their puripose was to toler the data needed to evaluate models of phime-rise form cooling towers and models of atmospheric hydrogen sulfide transpore and dispersion. The field experiments were again divided into meteorological measurements and tracer experime

for develop its models, ASCOT begins with unidels that exist at the various participating lideoratories, determines their applicability in the study of nocturnal thrainage winds and, if appropriate, uses them to develop a spectrum of modeling capabilities from one- to three-dimensional. New models have been developed and all have been classified into three types: (1) hydradynamic, (2) statistical, and (3) transport and diffusion. Two and threedimensional simulations of the 1980 tracer experiments have been produced, but evalua

tion of these results is still in progress.
ASCOT is considering the Brush-Roan Greek area of western Colorado as a cambdate for the primary study site for the next several years. Exploratory field experiments were conducted there between July 26 and August 7, 1983, including two experiments at valley scale, one at multivalley scale, and one at regional scale. These studies were primarily concerned with nicusarements of the temparal and spatial variations of the surface and upper-air wind and temperature structure covering the three spatial scales of interest throughout the complete diurnal cycle. The meteorological measurement systems includeil tethersondes, airsondes, optical anenioneters, acoustic sounders, and surface meteorological stations.

At the same time as the ASCOT experi ments in Brush-Ruan Creek area, the U.S. **Environmental Protection Agency's Green** River Ambient Model Assessment (GRAMA) program combined sulfur hexalluoride (SFa) tracer dispersion studies within the Brush Creek valley. The tracer releases were initiated during the northroad drainage period and continued through the morning transition period until the establishment of davrime apslope and apvalley flows. Surface concentration patterns were defined by a network of surface samplers located along the valley slones and axis. Vertical probles of tracer repentrations were acquired by balloon and aircraft sampling systems. In addition to the GRAMA experiments, DOL-sponsored deposition studies were also combined in Brush Creek valley using SFa and lithium particle

ASCOT plans to publish a progress report in early 1984 describing the Geysers data analysis and results. Several ASCOT participams have had individual contributions published in various partnals. A more extensive held experiment in the Brush-Roan Creek area is planned for 1984.

This army item was countibuted by M. M. Orgill and J. M. Thurp of the Pucific Noethwest Laboratory, Richland, WA 99352.

Editorial

AGU and Nuclear War

The potential involvement of AGU in proper scientific discussion of geophysical questions relating to nuclear war and nuclear weapons on the earth and in space is being considered by a special subcommittee of the AGU Committee on Public Af-

In these areas of very high public and governmental roncern, AGU clearly has the most directly related relentific experuse of any major scientific society. Since geophysical science is critically relevant to public discussion and policy in these issues, AGU may have a responsibility to rontribute. We may at least want to inform ourselves on the science that is being

The National Academy of Sciences and the Council of the American Physical Society have each adopted resolutions this year deploring nuclear war and urging the nuclear nations to substantially intensify negotiations on nuclear arms agreements. (See the March and May 1983 ismes of Physics Tuday.) However, the AGU Committee on Public Affairs feels that any AGU activity should be clearly locused on scientific contributions and that a resulttion is not a good idea for us. In fact, the committee feels that the statement on advocacy adopted by the AGU Council in May 1982 (Eas. August 2, 1983, p. 188) is the best guide to our responsibility and to the sort of things we might do:

"Aslewcacy and the American Geophysical

"The American Geophysical Union is an association of scientists, scholars and interested lay public for the purpose of advancing geophysical science. The Union shares a collateral sense of responsibility to assure that the results of geophysical research are made available to benefit all mankind. The Union emonrages its mem hers to exercise their individual senses of esponsibility in addressing political and signal issues. Should they choose to art yol lectively on such issues, other organizational bita exist for such purposes.

"The American Geophysical Union, as a society, should areserve its unique position as an objective source of analysis and commematy for the full spectrum of geo-physical science. Accordingly, the followng policies should guide the American Geophysical Union's role as an advocate:

"The American Geophysical Union has a responsibility to its members to adopt a position of advocacy on geophysical sci-ence issues based on their intrinsic merits and needs.

"To the extent that the understanding and application of geophysical science is relevant to public policy. AGU as a re-

spinisible scientific association should make relevant information available to all parties interested in the issue.

"As a reientific society AGU should not take or advocate public positions on judgmental issues that extend heyond the range of available geophysical data or rec-ognized norms of legitimate scientific debate. Public positiona achipted by AGU and statements issued on its behalf must be based on sound scientilic issues and should reflect the interests of the Union as a whole."

Union symposia at our national meetings seem to be the easiest way to bring the AGU expertise together to "make rele-vant information available" in the current goephysical science of nuclear wearours and war. Accurdingly, For the 1985 AUU Fall Meeting in San Francisco, Joseph V. Swith (University of Chicago) and Thomas J. Ahrens (California Institute of Technology] have organized a morning Union session of review talks on Geophysical and Geochemical Consequences of Nuclear Explosions for Wednesday, December 7. followed in the afternoon by a session of specialized talks emphasizing the atmosilieric ellects.

We believe these will be lambara k sessions. We have that as many members as possible attend them and consider the AGU role in this science.

Were do we go from there? Further special programs: Workshops: Publicaions: The AUU Ad-Hor Subcommittee on Geophysical Aspects al-Nuclear War and Arms Limitation (Miriam A. Forman, Staniatios M. Krimigis, George Paulikas, Joseph V. Smith. Lynn Sykes, Martin Walt, and Jared Co loor, chairmans is charged to determine what role AGU should play in the ongoinclude along the geophysical science of modear weapons and war, and what we should do. How can AGU help us all best contribute as individual scientists and as a Union to this extremely important public discussion of a topo, having a strong geophysics aspect!

Since this is such an important and sensitive issue and is new territory for most of us, we are asking all the members for their suggestions. Please write to us.

Miriant A. Joonan State University of New York at Stony Brook Stmty Brook, NY 11794

> Stamatios M. Krimigis Applied Physics Laboratory Johns Hupken University Land, MD 20707

For the AGU Committee ou Public Affairs

Earth Science Ph.D.'s Up 13%

While the total number of research that tormerawarded in the United States in 1982 was doen slightly from 1981, the number of such dogorates awarded in the earth, environmental and marine sciences (EEMS) ruse nearly 13% according to a recent document from the National Research Council.

The 31,048 research docurrates awarded by US universities in 1082 is down from the 31,342 awarded in 1981. The number of EFAIS doctorates awarded in 1982 was 657. sp from 582 in 1981 (Eas, August 10, 1983,

The total number of women receiving docbontes in all fields in 1982 increased to 10.057, passing the 10,000 mark for the first Designate Recipients from United States Universi-

Source: National Research Council.

ites, published by the National Academy Press. The largest increases in the number of winners I'h.D.'s accurred in the physical and life sciences. Data for the report was compiled by the National Research Council for the National Science Foundation, the U.S. Department of Education, the National Institutes of Health, and the National Endowment for the Humanities.

Of the 657 EEMS doctoral degrees awarded lu 1982, 55-1 went to men. About 80% of these EEMS Ph.D. recipients were U.S. citizens and nearly two-thirds were married. The median age at which the EEMS class of 1982 (men and women) received their doctorates was 30.8 years; the median time from baccalaureate to doctorate was 8.3 years (total time), with 6.4 years as the median time as a registered student.

Like their 1081 colleagues, women receiving EEMS doctorates in 1982 showed a lower according to the Summary Report 1982: median age (29.8 years) than their male classmates (30.9 years). In 1981 the median age at

1989

doctorate of women (29.94 years) and then (\$1.06 years) was higher than in 1982. The two fields within EEMS conferring the

most doctorates in 1982 were oceanography and solid earth geophysics; the two fields granting the fewest were atmospheric physics and chemistry and geomorphology and gla-cial geology (see Table 1). The 1981 rally showed the same result

One-quarier of the EEMS graduates planned to get a postdoctoral position; nearly 20% had definite postdoctoral arrangements. Nearly 70% planned to get a job, but only 55% lead definite commitments from employ ers.—BTR

Underground Lab Proposed

There is a new effort to spend more than, \$45 million for the construction uf an underground national laboratory, this time for the purpose of observing natural phenomena, but of course with a high-energy physics overtone. To be observed are phenon such as the gravitational constant and the earth's natural neutrino flux. This is to be a project in the realm of "non-accelerator phys-ics" and na such will be breaking new ground

in federal big-science funding.

The idea is to locate an elaborate facility for testing a number of very basic physical theories. The laboratory is to be located underground at a depth of 1-2 km at the Nevaida Test Site. The area selected will be free from surface background effects and will benefit from "plenty of land, where the geology is thoroughly understood" according to a recent report (Science, Augual 26, 1983).

The Los Alamos National Laboratory is supporting the project and can offer geological support, according to the Science report;

cal support, according to the steam of the support, according to the steam, as it happens, is itself strong in the geophysical arts: The laboratory has long been involved in developing an underground nuclear waste disposal lacility.

A new, well-supported facility may, for ex-

ample, take geoply sicist Raymond Davis from his damp tunnel at the Homeatake Goldmine in South Dakota to a mucli-improved experimental site. Davis has been working with others from the Brookhaven National Laboratory for more than 10 years at the Homestake Mine to obtain usable valuea of the neutrino flux which originates in

The flux, it is now known from these measurements, has turned out to be considerably smaller than that calculated from models of the sun's hydrogen fusion reaction. Either the sun has different reactions or composition than now understood, or else the Hnmestake experiment is not sufficiently sensitive to the

The experiment now is to monitor the argon-37 produced by the high-energy, neutri-no + chlorine-37 reaction in a large tank of chlorinated dry cleaning fluid. Apparently, the low-energy neutrino flux, if it can be accurately determined, could provide a more direct measurement. The low-energy measurements would involve the neutrina + gallium-71 reaction to yield germanium-71. This mensurement would be costly: "The scale of the experiment is certainly worthy of a.national facility ... fortunately it [the germanium] could be resold at the completion of the .

Measurements of cosmic-ray intluced and other high-energy neutrinos could be done in the new facility with a neutrino detector that, in the manner of a telescope, could plupoint their source within a few degrees. Neutrinos could be observed in order to look for differences between those that travel the short distance through rock at the Nevada Test Site and those that pass completely through the

Locating gravity-rocasurement devices underground at the Nevada Test Site is desirable in order to avoid "mass contamination." At the aurface, mankind moves too many objecia. The "National Underground Science Facility," as it proposed by the Los Alamos National Laboratory, would house a number of delicate instruments to measure the grayl-

News (cont. on p. 586)

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ment sheet corresponding to a course of in the collectic plans.

J. Geophys. Ses., Slus, Paper 341464

PORZARC BIDGES AND ITS ROLE IN THE EXPOSURE OF HIGH P/T NETAMORPHIC TEXPANCE
Terry L. Pavils and Romeid L. Bruho (Depactment of Gaslogy and Couphysirs, belverally of Desi, Seit Lake City, BT 84112
Forsarc systems avolve through the interplay of memorous proresses, but saids from interal movement as mach of the observed veriability in eorphology ram he caleted to evolution of durelity in the deoper lavele oi the subduction rougher. In the sesiorn Alsucies, Leaser Autilias, Makras, sod Casceds err trench speakes a 50- to 200-km-wide ionears ridge is developed slong the induced edge of the subduction scenario. Those focases cridges did sut form until subduction scenarion had espended the err creach gap to 275-180 km and the near vegitical time of the tadge secured 30 km or more from the trench slope brash; the forearc high appearently maintained by excention at the treorh. Thue these breake [the proress camponella for epilit is occurring within the subduction complex and the large propersity as a component of the provence camponella for epilit is

live. The predicted tone of durille deforming directly humanit the arco is which a forest clipt generally developed; hence we repelofe that the interest property of the live is a repelof that the interest property of the live is experienced that the interest property of the live is constructed flow. By charactering of the live is constructed by subhoticoust locality, and forces the provide the induced by subhoticoust locality, are provides the simplest explanation for the charactering forces of the inconstitution of flow provides the simplest explanation for the charactering of facts the distribution of sais on the underplating of facts the distribution of sais on the development of the complexity of interaction and the observation that modern facility and the paper cooks are only exposed in unseal family system, e.g., system at the tablest proposition of upilit are large influence of the conferring of upilit or large influence of deep noderplanation in the development of focusion explosions and promessor related to occord ion at the treat and promessor related to occord ion at the treat and promessor related to occord ion at the treat complex becomes details at depth, within defension and promessor related to occord ion at the treat complex becomes details at depth, which defension and promessor related to occord ion at the treat complex becomes details at depth, which defension and promessor related to occord ion at the treat complex becomes details at depth, which defension and promessor related to occord ion at the treat complex becomes details at depth, and ultimally despenses and flow leads to should some interest of the subduction subject.

TABLE 1. Earth, Environmental, and Marine Science (EEMS) Doctorates Awarded Field of Doctorate Total Applied geology discopheric dynamics 27 Atmospheric dynamics
Atmospheric physics & chemistry
Atmospheric sciences, other
Earth sciences, general Enth sciences, other Indicamental sciences, general Eminomental sciences, general
Eminomental sciences, other
Geochemistry
Geophysics (solid earth)
Hydrology & water resources
Manne sciences
Mineralogy Call for Papers (including abstract specifications) dineralogy, petrology

Men Total 21 22 Oceanography
Paleonology
Straigraphy, sedimentation real FEMS 27 582 628

News (cont. from p. 585)

tational constant and to test the inverse-

It is not clear that the U.S. Department of Energy will be able to fund the new facility. but the possibility exists. Experiments will be done to attempt the observation of nuclenndecay chains, which are predicted by the grand, unified the ories of physics. That all of these long-term, fundamental measurements will be able to survive funding competitinn against the current round of "accelerator physica" proposals is in doubt.—PMB

Naval Research **Fellowships**

The American Society for Engineering Education (ASEE) is seeking applicants for 40 fellowships that will be awarded by the Office of Naval Research (ONR) in 1984. This program is designed to increase the number of U.S. citizens doing graduate work in such ficilts as ocean engineering, applied physics, electrical engineering, computer science, naval architecture, materials science, and aerospace and mechanical engineering. The fellowships are awarded on the recommendation of a panel of scientists and engineers convened by the ASEE. The deadline for applications is February 15, 198-1.

The program is open in graduating seniors who already have nr will shurnly have baccalaureates in disciplines vital to the research aims of the Navy and critical to national defense. As a reflection of the quality of the program, 1983 fellows had an average cummulative grade point average of 3,88; nine hail a perfect 4.0.

Each fellow will receive an annual stipenal of \$12,500, and the ONR will pay tuition and fees and provide \$2,000 to the department in which the fellow will pursue graduate studies. The Navy also encourages fellows to conduct research at its laboratories thuring the sum-

For more information about the program contact John Lisack, Jr., Hirector, Membership, Projects, and Federal Relations. The American Society for Engineering Education. Snite 200, 11 Dupont Circle, Washington, DC 2003B (telephone: (202)292-7080).

ICSU Press

The International Council of Scientific Unions (ICSU) has established a publishing arm called ICSU Press. The Press is intended to complement the publishing activities of its member scientifie unions in several ways: Ininiate special publications of research fintlings and new journals of reviews or research; advise, or act as publishers for, members requesting such service; and engage in copub-bishing ventures with international bodies uniside of ICSU whose goals are consistent with ICSU's.

Plans for ICSU Press also include preparation of television programs in cooperation with BBC-2 in Britain and PBS and ABC in the United States.

ICSLI, an international, nongovernmental organization founded in 1931, is composed of 20 international scientific unions (including AGU), 66 national members, and 17 scientific and 4 national associates. Further information may be obtained from F. W. G. Baker. Executive Secretary, ICSU, 51 Boulevard de Montmorency, 75016 Paris, France.

Geophysical Events

This is a summary of SEAN Bulletin, 8(8), Augus 31, 1983, a publication of the Smithsonian Institu-tion's Scientific Event Alers Network. The complete Mount St. Heleas, Macrionald, Teahitia, and Pumice Raft reports are included; the earthquake report is

by P.N. Mayaud

From the Foreword:

Geophysical Monograph 22

Explains it all.

"...thia book will surely be recognized in

The years to como as o closate. Scientials

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Alexandor J. Desalt

thot this monograph contains all thot

geomagnetic indices that may interest tham."

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an excerpt. The complete bulletin is available in the ofiche edition of Eos as a mirrofiche supplement or as a paper reprint. For the microfiche, or-der document E83-009 at \$2.50 [U.S.] from AGU Fulfillment, 2000 Florida Avenue, N.W., Washington, DC 20009. For the paper reprint, order SEAN Bulletin Igiving volume and issue numbers and issue date) through AGU Separates at the above address; the price if \$3.50 for one ropy of earh issue numbe for those who do not have a deposit account, \$2 for those who do; additional copies of each issue number are \$1. Subscriptions to SEAN Bulletin are avnilable from AGU Fulfillment at the above address; the price is \$18 for 12 monthly issues mailed to a U.S. address, \$28 If moiled elsewhere, and must be

Volcanic Events

Una Una (Indonesia): Continued explosive activity seen on satellite images; numerous magnitude 5 earthquakes

lliboleng (Indonesia): Small plume photographed by Space Shuttle astronauts liwerung (Indonesia): Submarine explosions Tangkuban Parahn (Indonesia): Increased scismicity; thermal activity; inflation

Kilauea [Hawaii]: 7th, 8th, and 9th major episocies profluce lava flows extending NE and S from spatter cone Mt. St. Helens (Washington): Lava extrusion

continues; internal dome growth accelerates; small fluidized avalanches; vapor and Okmok (Aleutlans): Possible eruption phome

on satellite imagery
Veniaminof (Alaska): Lava flow and ash emission ston: trentor summarized

Macdonahl (S-central Pacilic); Renewed submarine activity Teahitia (French Polynesia): Shallow earthquakes and high-frequency tremor Pumice Raft (S Pacific): Pumice in the Tua-

moto Archipelago; source unknown Pagan (Mariana Is.); Ash donni seen from air-

Langila (New Britain): More, stronger explosiona; ashfalls to 10 km Manam (Bismarck Sea): Emissions increase

slightly; B-type events continue Ruapchii (New Zealand): Upwelling in crater lake; slight inflation Etna [Italy]: No new activity; addition to last

month's ligure caption Atmospheric Effects: June-July balloon clata

show new layers near tropopause; only El Chichon aerosols detected by lidar in Att-Kilauea Volcano, Hawnii, USA 119.42°N. 155,27°W). Correction: lit the Eos summary

of the June 30, 1983, SEAN Bulletin (Eos. August 9, 1983, p. 500), the rate of 50s emission on June 30 and July 1 was incorrectly reported as 7200 metric tons per day. The correci figure is 8000 metric tons per day.

MI. St. Helens Volcano, Cascade Range, S Washington, USA (46.20°N, 122.18°W). Until February 1983, growth of the composite lava done had occurred in a series of brief extruslott episodes, preceded by several weeks of increasingly rapid Internal dome growth that stopped suddenly when lava reached the aurface. However, internal growth did not cease with the onset of the February extrusion episode (see SEAN Bidletin v. 8, nos. 1-3); it continued as spines were extruded in April, and a new lobe emerged onto the donie's NE flank about May 1. New lava was still being added to this lobe in early September and deformation of other parts of the dome was ac-

The front of the active lobe moved down the NE flank at about 1 in per day in August, roughly the same rate as in July. Rotkfalls from the lobe's leading edge appeared to de-cline in July and August but continued to remove some material, reducing the lava's net August advance to 20-25 m.

Rates of outward movement of aurvey targets on the S, SE, and N flanks of the dome began an irregular increase about July 8 and by early September had reached nearly 11 cm per day high on the S side. No acceleration of

Dr. Mayaud presadts a historical review

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Geomagnalism ond Aeronomy.

Earthquakes Date

24.73°E tt km 1544 August 6 N. Aegean Sea 0348 5.8M. 35.47°N 138.91°E 49 km Honshu, Japan Kamihaika, USSR 6.5m_ե 6.7M_ե 55.67°N 120 km 1056 161.51°E 18.13°N 1218 121.05°E shallow Luzon, Philippines August 17

Magnitude

(UT)

Latitule

Longitude

endogenous growth was observed in the area of most rapid deformation, below the active lobe on the NE flank, where rates averaged 60 cm per day. Movement of crater floor stutions N and S of the flome was first fleteeterl around early August, gradually increasing into the millimeters-per-day range by enrly September. The pattern of increasing deformation was generally similar to perioda that preceded extrusion of new lobes in 1981 and 1982. However, Donald Swanson noted that the irregular acceleration of endogenous growth contrasted with the quite steady increases measured hefore 1981-1982 extrusion enisodes and that it was continuing after 2 months without the onset of new extrusion, execeding the typical 1 month-6 week durations of the 1981-1982 premonitory periods.

curred from a N flank notch that was propaating upslope toward the dome's extrusive vent. This activity built a large, structurally unstable talus alope of hot blocks. Upon reaching the talus, some rockfalls became fluillized, probably by entrainment of heated air from between talus boulders. Early August 12. Daniel Dzurisin observed a group of large boulders from the notch bounce onto the talus. A few seconils later, a second rockfall reached the talus and fluidized. An ash cloud quickly formed over the avalanche and moved downslope at the same speed as the entrained boulders, stopping as they came to reat. The avalanche formed a lobate deposit with marginal levees ≤1 in high. Fine partitlea extended to roughly the distal end of the boulder deposit. Ash clouds formed by smaller avalanches were diffuse enough so that bonders could be seen rolling slowly downstially fluidized. The avalanches traveled no more than several hundred meters beyond the N side of the crater. For several days after a large mckfall, avalanches occurred roughly every 2 hours, but declined in 1-2

per day during quiet periods. Occasional ejection of steam and ash that the volcano emits more SO2 while

duced a 4-fold increase in SO2 emission, August, ranging from 40 to 9ll tons per tlay most of the mouth, but measurements be-

August seismic activity was generally similar to that of July. A substantial increase in ter walls as warm weather melted snow on number of earthquakes and the rate of seis-

information Contacts: Tom Casadevall, iliur Blvd., Vancouver, WA 98661 USA; Steven Malone, Geophysics Program, University

Oteau (28.98°S, 140.25°W). In May, the Réseau Sismique Polynésieu recorded seismicity from renewed eruptive activity at Macdonald. lts eight previous eruptions had begun with explosive events, but the May activity did not and probably was a continuation of the March eruption (see SEAN Bulletin, v. 8, no. 4). Reconaissance by a Marine National Francaise vessel did not show a perceptible intrease in the volcano's aummit altitude since the bathymetric aurvey of February 1982. Macdonald was discovered after hydrophones recorded sounds accompanying an eruption

on May 29 1987. Information Contact: J. M. Talandier, Dir-

nesia, S Pacific Ocean (17.57°S, 148.86°W).
Between July 11 and 20, the Reseatt Sismi-que Polynésien (RSP) recorded \$,000-4,000 shallow earthquakes at Teahl(la, accompanied), by high-frequency volcanic tremor, Teahl(ia, a scamount with a atminit about 2 km below

sociated with a submarine eruption detected by the RSP in March-April 1982 (see SEAN Bulletin. v. 7. m. 4).

Depth

Finus

Region

Information Contact: Same as for Mardon

Pumice roft, S Pucific Ocean. While traveling E of the Kermadee Islands on April 6, Captain J. McInnia of the yarlıt Curkoo's Nest en countered a coughly 1-hectare area of small pieces of pumice at 27.58°S, 177.40°E, in which he noted some bubbling but no smells [see SEAN Bulletin, v. 8, no. 4]. The source of the pumice remains unknown. Analysis of March and April records from the Réseau Sisminne Polynéaien (RSP) revealed no acoustic waves (T-phase) from empions other than that of Macdonald Seamount (see SEAN Bulletin, v. 8, no. 4). However, the numerous small islamls in the area of the Kermadecs, Tonga, Samna, and Fiji interfere with acoustic waves, preventing effective T-phase monitoring of volcanic activity in some parts of the S Pacific. 1. Talantlier notes that measurements of surface currents in French Polynesis and aimilar latitudes soggest diat punice from Macdonald should drift eastward, away

from the April 6 site. Pumite cante ashore at both the SE and NW ends of the Tuamoro Archipelago, on the Gumbier Islands (23.15°S, 134.97°W), and at Rangiroa (15.00°S, 147.67°W), 4800 km E and \$900 km ESE of the April 6 observation. No information on the amount of punke or the flate of its arrival at these locations was available. Talantlier mued that Rangiroais very remote from known active volcanoes other than those in the Mehetia region. where emptions occur at ilepths that are too great for production of pumice. Information Contact: Same as fur Maddon-

Earthquakes

Information Contact: National Earthquake Information Service, U.S. Geological Supey. Stop 967, Denver Federal Center, Box 25046. Denver, CD 80225 USA.

Meteoritic Events

Fireballs: W. E. Australia; SW England; North Sea; W Europe; Cubrado, Kansas, mid-Atlantic, Montana, Texas, USA.

Recent Ph.D.'s

Eos periodically lists information on recently at cepted the total tilescrations in the discipline of geophysics. For tily members are instead to rubat the following information, our institution letterless than the state of those the signiffine of the faculty advisor or deparment chalrman: the dissertation title, author's name name of the degree-granting department and ma-turbut, and mouth and year degree was awarded. It possible to bute the current address and telephone number of the degree recipient (this information will not be published).

Thermodynamir Analysis of the Systems CaCO+ MgCO+ and Fe2O+ FeTiO2, Benjamin Surton, Dept. of Earth and Space Sciences. State Univ. of New York, Stony Brook,

Ocean Scionces

Almospheric Interactions with Gulf Stream Rings William K. Dewar, Joint Program in Ocean ography and Oceanographic Engineering WHOI/MIT, February 1983.

inental Shelf Bottom Boundary Layer Iled el: The Effects of Wrives, Currents, and a M able Bed, Scott M. Glenn, Joint Program Oceanography ond Oceanographic Engineering, WHOI/MIT, February 1983.

Late Prieogene (Eccene to Oligocene) Paleocene graphy of the Northern North Atlantic, Sen-nelli G. Miller, Joint Program in Oceanol, raphy ond Oceanographic Engineering.
WHO!!MIT, February 1983.

The Numerical Synthesis and Inversion of Acoustic Fields Using the Hankel Transform with Applications to the Estimation of the Plane Ware A

cations to the Estimation of the Plane Wart Reflection Coefficient of the Ocean Bottom, Douglas R. Mook, John Program in Oceanography and Oceanographic Engineering. WHOI/MIT, February 1989.

Stable Isotope Geochemistry of Nitrogen to Manket Particulates, Suaan M. Libes, John Program in Oceanography and Oceanographic Engineering, WHOI/MIT, Fobruary 1985.

An Improved Loran-C Drifting Buoy and Dougle for Coastal Applications, William J. Burket, John Program in Oceanography and Oceanographic Engineering, WHOI/MIT, Inc. 1983.

Inverse Methods and Results from the 1981 Com Acoustic Tomography Experiment, Bruce D. Cornuella, Joint Program in Oceanography and Oceanographic Englueering, wHO!

Books

Water and Western Energy: Impacts, Issues. and Choices

and in Water Policy and Alamagement, vol. 1, S. C. Sallard and M. D. Devine et al., Westview Press, Boulder, Colo., xxix + 321 pp., 1982,

Reviewed by Yacor Y. Haimes

Since the 1973 nil embarga numerous stralis have been commissioned on the subject of water and energy, and thus the proliferation of books and reports on associated problems is not surprising. The importance of the is-mer at stake and the realization that we were relatively unprepared to deal with the amicipated high level of future coal and shale dedoment in the West altered our percepfions of many water-energy issues; the issues were elevated, at least in some quarters, from the level of a common planning problem to the level of a trisis. For those of us who were captured in this syndrome and were a part of hese "trisis studies," this abscument inescapably brings a sense of Iléja VII.

The review of books serves multiple guals and purposes for readers as well as authors. for example, when I read bonk reviews in Ea, I am most interested in one that briefly oduces the book's topics, indicates the droth and breadth of the this cussion, constructively highlights the major attributes and finitations of the book, critically evaluates the book as a whole, and, if possible, suggests other documents that either impplement or complement the book's writings. I will uttempt to do just this.

Water and Western Energy is a summary of a seies of studies on the subject conducted by

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speediest treatment of contributions semb bee copies of the double-spaced manuscript to one of the editors manual below and muc copy t

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Cover. Time-integrated photographs of steam plumes from multiple-cell power plant cooling towers at the Geysers geothermal area in northern California. The 300-second exposurea, which portray mean plume rise and boundaries, were one phase of a series of experiments condiscled in August 1981 as part of a conin Complex Termin (A SCOT) enongred in Complex Terrain (ASCOT) sponsored by the U.S. Department of Energy. Left to tall and short sleam plumes: (top) late at talk to the photographa show examples of th hight from a cooling tower located in n narrow valley and (bottom) during the afternoon from a similar tower located high on a ridge crest. (See news item, this issue.) Photos by J. M. Thorp and D. W. Glover, Pacific Northwest Laboratory, Richland, WA 99352.)

the authors for the U.S. Environmental Protection Agency during the late seventies. The studies were focused on the following prem-

anning the most critical problems associatcil with expanileil western energy ilevelopment, ilefense installations, Indians, environmental interests, and others.

Isues: Water requirements for energy develupment, pollution from energy facilities, nf the water polity system, and salinity con-

Policy alternatives: Water conservation, aug-

complexities involved in the formulation of water resource polities that are responsive to reginual differences, sectoral competition for water, institutional constraint and opportunities, sortheconomic considerations, environmental protection, and political roalitions necessitate a rather shallow discursion of the isrues. Indeed, the book provides a comprehensive overview of the problems associated with water and unergy development

in the western part of the tountry. Thus, as a compact compendium of statistical data and other valuable basic information concerning the interplay between water and energy, the book can be very helpful and useful. On the other hand, the efficient of the substantial effort spent by the authors on the development of ahernative policy options cannot be fully appreciated by the reader tar least this read-

First, the alternative policy options bemulated thiring the study (and documented in this book! are not adequately analyzed in terms of their impacts. Consequently, these uptions lose much of the rame in terms of understanding their genesis, rationale, and associated trade-offs. Second, the alternative

policy options were formulated during the administration—an era markerlly ililferent from the present one-so that many of the policies discussed in the book are of a somewhat academic nature and suffer from a lack of relevance to the world of today. The reference in the book to the Office of Water Research and Technology-which has been abolished in the meantime by Secretary of the

Interior James Watt-is a case in point. The book is rich in valuable ruminary tables, and, although it is written by 10 toatithors, it reads very smonthly. The authors should be complimented on producing a unified document on diverse and complex subjects. Finally, the impressive list of references should be most valuable to those interested in pursuing the subject further. Other related reports on the subject include the following

U.S. Department of Energy, Institutional Constraints on Alternative Water for Energy. DOE/EV/10180-1, November 1980. U.S. Department of Energy, Water Supply

and Demand in an Energy Supply Model, DOU EV/10180-2, Detember 1980 U.S. Department of Energy, Wnter Quality

lssues and Energy Assersment, DDE/EV/10154-, November 1980. U.S. Department of Energy, Granud Water and Energy, CONF-8110137, November 1980. U.S. Department of Energy, Water Related

Vacou V. Hunnes is with Case Western Reserve University, Cleveland, Oll 44106.

Planning and Design at Energy Firms, DOUFN!

New Publications

10180-1, November 1980.

Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

Conservation of Water and Related Land Resomers, P. E. Black (Ed.), Praeger, xx + 209 pp., 1982.

The Solar Spectrum. From the Echelle Spectrograph Flown in 1961 and 1964, C. E. Maore, R. Tousey and G. M. Brown (Eds.). Naval Res. Lab., Washington, DC, vi + 159 pp., 1982.

Structure and Development of the Greenland-Scot-land Ridge: New Methods and Concepts, M. H. P. Bott, S. Saxov, M. Tahyani, J. Thiede (Eds.), Plenom Press, New York, x + 685 pp., 1983, \$85.

Surface Mining Environmental Monitoring and Reclamation Hawlbook, L. V. A. Sendlein, H. Yazicigil, C. L. Carlson, and H. K. Russell (Eds.), xv + 750 pp., Elsevier, New York, 1983, \$85.

Correction The following book was incorrectly listed in the September 13, 1988, issue

Short Period Climotic Variations: Collected Works of J. Namins, vol. 3, 1075-1982, University of California, San Diego, Graphics and Reproduction Services, x + 393 pp., 1983, \$8.

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[8] Three letters of recommendation to:

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The University of New Mexico/Reaearch Associate. Applications are invited for a permatent position as a research associate in the Department of Geology at The University of New Mexico. The applicant should have experience in characterizing the structure, morphology and chemistry of solid materials with the analytical electron microscope (to be purchased this year) and will be responsible for the day-to-day operation of the instrument. The work will involve the characterization of metallic, ceramic and composite materials, including rockforming minerals. The scanning transmission electron microscope will be part of an Electron Microbeam Analysis Facility which includes a fully-automoted ARL EMX-SM electron microprobe; an automated, five spectrometer, 793 JEOL Superprobe and an Hitachi 450 scanning electron microscope. Each instrument has an EDS and is housed in newly constructed laboratories. Experience in x-ray diffraction crystallography and secondary x-ray fluorescence analysis would be useful. The successful applicant is expected to maintain his/her own active research program and to interact with faculy throughout the University in rooperative materials science research.

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4. 1.

Derivation, Meaning, and Use

of Geomagnetic Indices (1980)

Numerous rockfalls, some quite large, oc-

lope; these avalanches seemed to be only parthe base of the talus, into the large breach on

plumes continued from several vents in the broad summit region of the dome. The unuber of plumes varied from day to day but generally ranged from 3 to 6 daily and remained relatively unchanged through the summer. Plumes typically rose about 1 km above the dome, and deposits were usually limited to the area of the dome's summit. No projectiles from these plumes reached the crater floor in August. Tom Casadevall re-

ported that COSPEC measurements indicate plumes are being ejected than thiring unict periods; on August 18 a plume briefly pru-However, plume events normally last only 15-20 minutes, and the excess SO2 volues detay exponentially, so they ilo not have a large effect on daily gas flux. The rate of SO₂ emission averaged 70 ± 50 metric tons per day in

tween August 18 and 23 yielded values of more than 150 tons per ilay. surface events was recorded, but was thought to reflect increased avalanching from the crathe rim. For about 10 days in late August the

mic energy release increased alightly but delined to previous levels by early September. Daniel Dzurisin, and Donald Swanson, USGS Cascades Volcano Observatory, 5400 MacAr-

of Washington, Seattle, WA 98195 USA.
Alnedonold Seamount, south-central Pocific

cteur, Laboratolre de Géophysique, Comissariat à Energie Atomique, B.P. 640, Papeete, Tahiti, Polynesie Française.

Teahilla Volcario, Society Islands, Franch Polynesie Paris Communication (1988)

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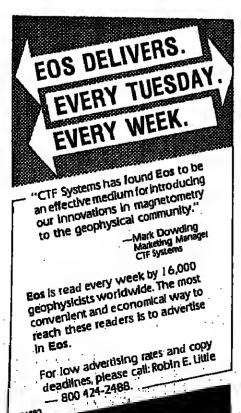
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opportunity employer; women and minority appli-rants are encouraged in apply.

University of California/Faculty Appolotmonts.
The Department of Geology and Geophysics at the University of California, Berkeley, C.A. 94720, pending budgetary approval, expects to make two farulty appointments effective Fall 1984, one at the junior level and one at the senior level. Applicants must be interested in pursuing a vigorous research program and in teaching both undergraduate and graduate students. The preferred areas of specialization are sedimentary petrings and entheriors.

Virginin Polytechnic Instituto and State University/Petrologist. The Department of Geological Selences at Virginia Tech Invites applications for a tenure-track junior level faculty oppointment in Igneous or Metamorphic Petrology. Applirants taust demonstrate a strong research record in quantitative petrology: preference will be given to those with experience in the theoretical and experimental aspects of petrology. All faculty members at Vitginia Tech are expected to provide quality teaching at the undergraduate and graduate levels, supervise M.S. and Ph.D. theses, and conduct an active program of research and publication.

Applicants should send a letter of application, academic vitae and names and addresses of three references to:

D. A. Hewitt
Department of Ceological Sciences
Virginia Tech
Blacksburg, VA 24061
The appointment will begin in September 1984
and candidates are expected to have completed requirements for the Ph.D. by that time: The deadling for receipt of opplications is December 15, 1983.
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pplirations should include a resume, a statement escarely interests and the names of at least three

tions and in provide quality instruction. The Department will expand into a new building January 1986. graduate levels.

The Department of Geology houses a variety of farilities for geodieniral research heliuding atomic absorption spectrophotometer, x-ray diffraction and fluorescence units, an isotope-ratio mass spectrometer, and two electron microprobes. Nu-1986.
For consideration send resume, three letters of reference and a description of research to Lyle McGinnis, Farnly Search, Department of Geology, Louisiana State University, Baton Ronge, LA 70803—4101. Search Will remain open until posi-Campus.

This position is available immediately. We expect

LOUISIANA STATE UNIVERSITY IS AN AIR to make the appointment at the Assistant Professor level. Salary will be commensurate with experience and qualifirations. For equal consideration, please and qualifirations. For equal consideration, please submit a letter of application which includes a statement of current and future research interests as well as curriculum vitae, bibliography, and the natures of 3 references willing to romment on your qualifications and promise to Thomas F. Anderson, Department of Gendegy, 245 Natural History Bullding, 1301 W. Creen St., Urbana, IL G1801, 12173838-0355 by November 30, 1983. The University of Illinois is an equal opportunity/affirmative-action emphaser.

Stanford University/Civil Engiaeering. The Department of Civil Engineering is seeking candirlates for a tenure-track faculty position at the level of Assistant Professor in the area of fluid mechanics starting September 1984. Candidates must have a lth.D. and some professoral experience is desirable. Duties include teaching of undergrafulate and graduate courses in fluid mechanics, and rierelopment of and participation in independant and team research in fluid mechanics, particularly as it interfares with problems in environmental engineering and science. Candidates should have training and/or experienre in experimental, theoretical, analytical, and numerical fluid mechanics. Particular strength in one of these areas is required.

Stanford University has a strong institutional commitment to diversity. In that spirit, we are particularly interested in receiving applications from women and ethnic minorities. Those interested in filing an application for the position should sent a resume, college transcripts, a list of references, and representative publications (if available) to Professor Joseph B. Franzini, Department of Civil Engineering, Stanford University is an equal opportunity employer through affirmative action.

Louisiann State University/Tmure-Track Faculty Positions in Geology. The Department of Geology is expanding from 15 to 35 faculty with four positions open Fall 1984 and one pusition thield Camp Director) open January 1984. Caudirlates must have the Ph.D. and have active research in pringress that might be applied to studies of basins. Specialties of primary interest are field geningy, theoretical seismology, hydrogeology, and organic geochemistry; however, other disriplines will also be cunsidered with quality of research being the primary fartur in applicant selection. All faculty in the Department are required to ronduct research leading to publications and in provide quality instruction. The De-

ouiniana State University/Chas. T. McCord, Jr. Louiniana State University/Cbas. T. McCord, Jr. Endowed Professorahlp in Hydrocasbon Exploration: The Geology Department is seeking an internationally recognizer leader in some research specialty eritical to the search for oil and gas to fill the Chas. T. McCord, Jr. Endowerl Professorship, Applirants are expected to maintain scholarly research in their area of specialty. Rank at Full Professor level with salary rompeinive with endowed professorships at other major research universities. For ronsideration send resume, three letters of reference, and a destription of future tesearch programs to Lyle MrGinnis, Faculty Search, Department of Geology, Louisiann State University, Baton Renge, LA 70803—4101. Search will remain open mail position is filled.

ion is filled.

LDUISIANA STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY

Ohlo State University/Structural Geologist. The Department of Geology and Mineralogy, The Ohin State University, invites applications for a tenure-State University, invites applications for a tenure-track position for a structural geologist with a strong background in quantitative analysis of field data and research interests in regional tectonits or tectonophysics. The successful applicant will be expected to participate in the undergraduate program and give graduate courses in his/her field of expertise, ronduct research, supervise graduate students, and interart with other departmental programs in regional geology and geophysics. Preference will be given to candidates with post-doctoral or industrial experience. Sank and salary commensurate with experience and research record. Please send applications or nominations as soon as possible to:

experience and research record. Please send applications or nominations as soon as possible to:
Dr. Ralph R.S. von Frese
Chairman, Search Committee
Department of Geology and Mineralogy
The Dhlo State University
Columbus, Oll 45210
Phone: 1614) 422-5655 or 422-2721
Applications should include a resume, a statement of research interests and the names of at lenst three persons whom we may contact for recammendaof research interests and the names of at tenst three persons whom we may contact for recummending. The closing date for applications is December 23, 1983; appointments will be effective no Interthan Ortober 1, 1984. Additional information can be obtained by writing or calling the sentth enumbers challenge.

Oregon State University/Biological Decanographer. Applications are invised for a 12-month, iemuse-track position as Assistont Professor in the College of Occanography. Dregon State University. The applicant most have demonstrated ability to conduct independent research and obtain research funding in the area of marine zooplankton ecology. Workers with interests in zooplankton ecology, general biology, systematics and/or pelagic ecosystem theory will be ronsidered. Applicant must have a Ph.D. in biological oreanography. Postdoctoral experience desirable.

The appointee will be expected to teach rourses in general biological oceanography and in the ecology of marine zooplankton, to supervise graduate students, and to develop a program of gram-funded research. Salary: \$27,000-\$35,000 negoniable. Application material, including a brief statement of research plans and the names of three references, should be submitted not later than 31 Derember 1983 to: Dr. G. Ross Heath, Dean, College of Oceanography, Oregon State University, Corvallis, Dregon 97831. The Dhio State University is an equal opportuni-Oceanography, Oregon State University, Corvallis, Dregon 97831.

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Meteorologist/The City College of Tho City University of New York. The Department of Earth and Planetary Sciences Invites applications for an anticipated opening in meteorology. The appointment will start September, 1984. Applicants should have completed the Ph.D. by the time of appointment and have a strong background in synoptic meteorology and computer applications. In addition, the individual should have an interest in atmospheric chemistry or pollution as applied to urian areas, or physical oreanography. The person hired will be required to teach courses in meteorology, and possibly physical oceanography as well as develop and maintain an active research program. Participation in the CUNNY Ph. Programs Factorial Control of the CUNNY Ph. Programs Factorial Programs and CUNNY Ph. Programs Factorial Programs Factorial Control of the CUNNY Ph. Programs Factorial Control of CUNNY Ph. Programs Factorial Control of Culture Programs Factorial Control of Culture Programs Factorial C maintain an active research program. Participation in the C.U.N.Y. Ph.D. Program in Earth ond Environmental Sciences is anticipated. Rank and salary will be ronnmensurate with experience. Send resume, transcripts and direct letters of reference by November 30, 1988 to Professor Donnis Weiss, Chairman, Oepartment of Earth and Planetary Sciences, the City College, 138 Street and Convent Avenue, New York, N.Y. 10031.

The City College of the City University of New York is an equal opportunity affirmative ardon employer. graduate students. The preferred areas of special-tration are sedimentary petrology and sedimental-ngy, stratigraphy and petrology periody, regional tecturies, geochemistry, economic geology, and metamorphic geology. Applications, including the names of references, should be sent in the Chair-man at the above address by Jamuary 13, 1984. The University of California is an Equal Dipportu-nit/Afformotive Artion Employer.

Indiana University/Tenure Track Position in Igneous Petrology. The Department of Geology invites applications for a tenure track position in Igneous petrology with atrong emphasis on field plus oxperimental and/or theoretical considerations applicable to igneous rock systems. The duties of the appointment will consist of teaching on the undergraduate and graduate levels which will include petrology, petrography, and advanced courses in his or her own interest plus establishing a creadve research program. The appointment will be at the assistant professor level and will take effect in Au mating 1984. A doctoral degree is required, Applications, including a curriculum vitae and at least three letters of reference must be received by February 1984. Please send inquiries and applications of the death of the death of the second of the death of

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University of Alaska/Exploration Ceophysicis— Selsmic Stratigrapher. Applications are insied for a tenure-track reaching/research position in the Geology/Lieuthysics Program of the College of En-ciroumental Sciences. Prime responsibilities will be to teach graduate causes in the use of state-of-the-art recliniques in peroto teach graduate and some under graduate course in the use of state-of-the-art techniques in perceom exploration geophysics. The successful applicant will also decelog an innovarire researth program to complement our growing petroleom gology rurriculum. Disctorate is required, balosmál experience in hydrocarban exploration and, in partirular, the use of seismic reflection data to interpressuatigraphy and lacies is desirable. The nine-montraction position is open starting in January 1984. Rank and salary commensurate with qualibrations and experience. Resume and at least three references should be submitted to fir. Just G. Rodore, litrector, Hickitotr of Goostences, University of Alaska, Fardanaks, Alaska 197(1). Applications all be accepted until December 15, 1983 or und position is filled.

Your application for employment with the University of Alaska may be subject to Public Disclosure if you are selected as a fundist. The University of Alaska is an FIBAA employer

Soulr Dakota School of Mines and Technology.

Applications are invited for two positions which may be available in the Department of Geology and Geological Engineering. Both Involve teaching at the graduate and under graduate levels, thesis direction, and the development of research.

Geological Engineering: specialty in rork or soil mechanics, site evaluation, geologicalogy, peraleum/reservair engineering or engineering sismologh-Industrial experience desirable. A Ph.D. in on area of engineering is preferred.

Coal Geology: applicants should have a strong badgrunnel in coal petragouphy, preferably with experience with 17.5, coals. Experience as a polynologist palentholauist is desirable. The Ph.D. is required. The department has an undergraduate enrollment of 1711 majorts und a graduate enrollment of 1711 majorts und a graduate enrollment elements should soul a resume and three leners of recommendation to William Rougenhen, Dept. of

persons summed send a resume and three seners or recommendation to William Ranggenthem, Dept of Geodingy/Geological Engineering, South Dakota School of Mines & Technology, Rapid City, S.D. 57701. Deadline for application is December 15, 1083.

1983. SDSM&T is an equal-opportunity employer.

University of Cincinnati/Junior Lovel Tenure Track Position. The Civil & Environmental Engineering Department at the University of Cincinnation of Cincinnation of Cincinnation of Cincinnation of the following areas: Hydraulics and Hydrodogy, Geolerhuical Engineeries, Transportation or Structural blaterials. The department enjoys significant research funding, and applicant would be expected to be a part of that activity A Ph.D. in Civil Engineering or a closely related area is required. Send resume to Dr. James F. McDonough, Head, CEE, Mall Location 71, University of Cincinnati, Cincinnati, Olio 45221.

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Trent University/Environmental and Resourcs Studies Program. The Trent Aquatic Research Croup Invites applications for a Research Associate with Interest in inovement of radioactive isotopes with Interest in inovement of radioactive isotopes through aquatic ecosystems. Previous experience in through aquatic ecosystems. Previous experience in the lab and field research in low level isotope measurement or chemical speciation is required. Application at the control of the latest and possess a Ph.D. in Applied Limnelogy. Chemical Engineering or equivalent, The position Chemical Engineering or equivalent, The position will commence on November 1, 1983. Spid a least of application with C.V. and copies of published persons. Dr. R. D. Evans, Environmental Center, Trent University, Peterborough, Ontario, Canada.

University of North Carolina/Faculty Openings
Tenure track vacancy as Assistant or Associate Professor for Coastal Process Sedimentologists, with Interests in sediment dynamics of geochemistry or Exportmental Marine Ecologist, with Interests in Exportmental Marine Ecologist, with Interests in Exportmental Marine Ecologist, with Interests in Exportmental Marine Ecologist, with Interests of Exportmental Marine Ecologist, with Interests of Marine Science. Two year terms appointment of Marine Science, Two year terms appointment in newable once, available Spring, 1984

To apply for either position send resumts, determine describing research interests, and three references describing research interests, and three references in the Ecologist Science of Science Institute of Marine Sciences.

Morehead Chy, NC 28867

Closing Date—January 1, 1984. The University of Solity/Affirmative Action Employer.

ration skills. Salary range: \$22,432 to \$28,518, Sub-mit resume by Ortober 21, 1983 to: Robert S. Detrick, Marine Specialist V Position, University of Rhotle Istrut, P.D. Hox 357, Kingston, Rhode Is-land (2881).

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The University of Missouri-Columbia/Faculty Positions. The University of Missouri-Columbia Department of Geology plans immediate expansion through the addition of three tenure-track faculty positions. Appointment are antiripated at the assinant professor level, although higher tanks may be possible, beginning in August of 1984. Candidates will be expected to have completed requirements for the Ph.L. degree by that time. Faruhy members are required to provide quality instruction at both univergraduate and graduate fevel, and roadurt research leading in schintly publications. Successful candidates will be closen from the following special-ties:

Exploration Geophysics Solid Earth Geophysics Hydrogeology Analytical Struttural Grology Classic Sedimentology Applications should send resume, transcripts, and transcripts and transcripts and transcripts to: Tinn Freeman, Chairman Department of Geology University of Missouri Colorobia, MO 65211

Posidoctoral Awards in Dream Science and Engineering. Wombs Hole Oreamsgraphic Institution invites applications for 1-year postdoctoral scholar awards from new and recent nucleotates in fields of biology, rhemistry, engineering, geology, geophysics, mathematics, meteorology, and physics, as well as oreamgraphy. Recipients of awards are selected on a competitive basis, with primary emphasis plared on research promise.

Fellowship stipend is \$22,000. Appointees are eligible for group health insurance and a modest research budget. Recipients are entumaged to pursue their own research interests independently or in association with resident staff. Completed applications must be rereived by January 1, 1984 for 1984-85 awards. Awards will be announted by March 1st. Write for application forms to: Dean of Graduate Number, P.O. Box E. Woods Hole Dreamgraphic Institution, ITools Hole, Massachustiv 029-13.

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Professor of Masine Geophysien Tectonics/Stan-foad University. The Department of Geophysics is seeking catchelates for a tentre track position in the board area of manine geophysics and tectonics. We swek a creative scientist with esperience in gallering, meet prefing, and synthesizing marine geo-physical data and whose research interests cover de-positional, ignesits, and rection, processes on occan-ic places and sommental margins. Inputing a te-incited from marine geophysics with demonstra-rel scientific record in one of the above aspects of marine acadeesic or not mixe, who have demonsoff scientific terrord in one of the above aspects of matine geophysic of recombs, who have demonstrated an ability to develop new deas and research directions, and to good and reach gradient and undergraduate students. In consulering this appointment we are interested in maximizing micrastions with ougoing research groups in marine geology, plate tectonics, paleomagnetism, scienology and regional geology at Stanford. On new faculty member will be expected to develop a string research program involving both government and industrial patticipation.

Salary and rank will be commensurate with expe-

rience and barkground. Please submit a resume, a brief description of teaching and research interests, and references to: Dr. Amos Nur

Department of Geophysirs 321 Mitchell Building Stanford University Stanford, CA 94305 Stanford University is an equal opportunity em-ployer, and encourages the application of qualified women and minorities.

Syracuse University/Faculty Position in Structural Goology. Syracuse University invites applications for a faculty position in structural geology or a related field to be lilled on or after September 1. 1984. Tenure trark position, salary and rank open. Ph.D. or equivalent required. Applications accepted until the position is filled. Contact John Illekey, Chairperson, Department of Geology, Herroy Geology Laboratory, Syracuse University, Syracuse NY 13210, 315-423-2672.

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questions.

Applicants should have a broad barkground in science; be ordirulate, literate, and flexible; and he able to work well with people from diverse profes-

able to work well with people from diverse profesninnal backgrounds.

A public policy barkground is not required, aldrough such experience and/or a demonstrable interest in applying science to the submion of public
problems is desirable.

The fellowship rarnes with it a stipend of up to
\$28,000 plus travel allowances.

How to apply:

\$28,000 plus travel allowances.

How in apply:
Applicants should submit a lener of intent, a currirulum vitae, and three letters of recommendation.

The lener of intent should include a statement of why the fellowship is desired, how ron qualify but it, what issues and rangressional situations interest you, what role you envision as a congressional stienter fellow, and what outrome you hope for in relation to career goals. The individuals from whom you request letters of recontinentation should discuss you milessional connecture and total discussional consequence and total or reears your professional competence and other asmalified to serve as a Congressional Science Feb

Send your application to: Hepanment MP, Con-gressional Science Tellowship, AGU, 2000 Florida Arenue, N.W., 20009 Application Deadline: March 31, 1984

CRAOUATE STUUENT NASA TRAINFESHIPS The Horda State University is accepting applica-tions from prospective graduate smalents for parnet-pation in its NASA spontored Transcestin Program in Oceanographic Remote Sensing Techniques and Physics of An. Sea interaction. The superid for the calendar year is \$10,000. Strukturs toay be carefuled for degree in only opening and you in proposale. for a dratee in entire occanography or meteorology, for further information or application, please write:

Dr. James J. O'Brien NASA Trainceship Program Meteorology Annex The Florida State University Lallahasee, Florida 32300 19041 644-4581

Earth Sciences

The Lamont-Dollerty Geological Observetory of Columbia Univarsity invites scientista interested in any field of the certh aclances to epply for the following fellow-ships: Two postdocloral fellowships, each awarded for a period of one year (axtandebla to two years to spacial instances) beginning lo Saptamber, 1984 with e stipand of \$25,000 per ennum.

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Trainor: \$530, loseple R. Francica, Applications Branch, EROS Pára Lenter, Siony Falls, So. Hakota 57194, 1ch; 605-564-6111; FTS: 781-7114.

JOURNAL DE THE AUSTRALIAN MATHE-MATICAL SOCIETY, SERIES 83Special Issue on Waves in Floids. The issue contains 8 current research papers on water waves, linear and troubment internal waves and Rossby waves. The authors are P.J. Heyant, D.H. Peregrine, R.J. Sobey and F.J. Culman, F. Vierra and V.T. Burchwald, John W. Miles, N.T. Hring and S.A. Madowe, Roger I Hughes and C.H. Fandry, R.J., Bughes and I.M. Leile, I. was compiled and critical by Roger Grinishaw.

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Spenio quantate, and defend programs (double-reghts). Ability to motivate, develop, evaluate, an arch abodinates (double-weighted). K nowledge of

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nerts to these theories I double-weighted 1: 2) Ability

p diest and randoct all phases of research project

the abunce the state of knowledge of atmuspheric dentisty. 3) Ability to design and develop state-of-these trace gas sampling/sensing instrumentation with cost and time constraints, 4) Skill in communicating schedules, plans, sclenititie goals, and operation constraints involved in Hight missions. U.S. estimation and Ph.D. or equivalent in atmospheric dentisty or one of the space sciences are required. Jamental position in federal service. Solary ranges

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Calenty of Florida. The Department of Geolo-pinder applications for a tenure-trark position legisting with the fall term, 1984. The position will be filled a the assistant or associate professor level AFAD, is required and salary will be commensu-ne with qualifications. Although any research spe-day will be considered, preference will be given to the with interest in these general areas: generaliza-tions resolver as low-tenueralized requi-

Edig Schope geology or low-temperature gen-demany-diented sedimentology. Send cut iculous mend Slaters of reference by Janeary 15, 1981 in: B. K.D. Opdyke; Department of Geology; IRCGA; University of Florida; Galuctville, Florid-4-980.

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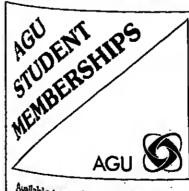
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Passology appeared in the August 30 issue;



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the material for the Amospheric Sciences Section appeared in the September 27 issue. The state of cambidates for all offices was carried in the June 21 issue.

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Tectonophysics: President-elect

Christopher H. Scholz A member of AGU since 1968; 40 years old. Professor of Geology. Columbia University: Senior Research Associate Lamout-Doherty Geological Observatory: B.S., Geological Engi-neering, Nevada, 1964;

Ph.D., Geology, MIT, 1967. Major interests; rock mechanics, earthquake source mechanism, and tectonics. Fellow, Caliech, 1967-68; Sloan Fellow, 1975-77; Green Fellow, UCSD, 1981-82. Fellow, ACII: member SSA. Former me NAS/NRC National Committees on Rock Mechanics and Seismology. Member of several NASA and USGS committees. Secretary, AGU Tecionophysics secilon, 1982-1984. 75 publications, 29 in AGU journals.

Statement

"I'm generally concerned that major geophysical problems become more, rather than less, interdisciplinary with time. This is reflected in my two major concerns with AGU, namely the journals and the meetings.
"I am in favor of JGR retaining its present

namely the journals and the incenting its present of an in favor of JGR retaining its present format and that it remain the foremost journal in geophysics in the world. In that I would reast any further aplitting of the journal into smaller subsections artisting addition and into smaller subsections artisting addition of options, such as papers published primarior of options, such as papers published primarior of options, such as papers published primarior in increfiche or the subscription to small, specialized categories of reprints. I do this in aplite of the information explosion and the rapidly dwindling bookshelf space in my of fice. I would also resist further proliferation of new AGU journals.

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maintained nearly equal for all these AGU

"Unless convinced otherwise, I would think that it would be a good idea that, for one of the two national meetings, Tectonophysics and Seismology hold a separate meeting. These two sections overlap considerably, and a separate meeting of these two sections would provide a smaller, more congenial meeting in which more interaction could oc-cur while at the same time reducing the problem of finding a large enough site for the meeting, a problem that has plagued AGU for several years. At the same time, I would strongly support an all-union meeting to be held once a year."

Richard P. Von Herzen A member of AGU since 1959; 53 vers old. Senior Scienust and Chairman, Department of Geology and Geophysics, Woods Hole Oceanographic In-schulon. Scientific interests: solid earth geo-

physics, esp. manne thermal investigations, electromagnetic induction, and sea floor tectonics, B.S., geoplysics, Caltech, 1952; M,A., geological sciences, Harvard University, 1956; Ph.D. me rine geophysics, Scripps Institution of Oceanography, 1960.

Oceanography, 1960.

Assistant research geophysicis, Scripps Institution of Oceanography, 1960–1964; deputy director, Office of Oceanography, UNESCO, 1964–1966; research staff at Woods Hole Oceanographic Institution, 1966-present, Visiting, research geophysicist and lecturate Scripps Institution, 1974–1975; Department of Earth and Blanciery Sciences, Intr. 1962. Joint Oceanographic Institutions for Deep Barth Sampling (JOIDES); Atlantic Paris 1963–1968; Chairman, Heat Flow Panel, 1967–1973; Chairman, Heat Flow Panel, 1967–1973; Chairman, Downhole Meastrements Fahel; 1961–1963; Planning Compilers, 1975; Chairman, Downhole Meastrements Fahel; 1961–1963; Planning Compilers, 1975; Chairman, Pownhole Meastrements Fahel; 1961–1963; Planning Compilers, 1975; Chairman, Downhole Meastrements Fahel; 1961–1963; Planning Compilers, 1975; Planning Com

1979. Author or coauthor of 75 scientific papers, 27 in AGU journals. Associate editor, JGR, 1969-71.

"A general definition of Tectonophysics as the study of the behavior of earth materials eucompasses very broad ranges in space and time domains. Dimensions range from molec-ular [friction] to thousands of kilometers (tectonic plates), and time scales from 10.1 seconds (seiamic waves) to 10s years (convection). The variety of investigations within tectono-physics is correspondingly large, such as to include narrowly-focused experts and broad generalists, all with needs to continunicate with each other. Increasing effectiveness of scientific communication should continue to be a primary goal of the AGU.

"Progress over the past few years in many subfields of tectonophysics is summarized in the U.S. National Report to the 1UGG, 1979-1982, recently published by AGU. In many of these articles, one has the impression of a relvation, and experiment, reflecting the vigorous advances in these disciplines. The wide recognition and modeling of tectonic plates as boundary layers for deep sented processes emphasize the differences between shallow vs. deep tectonic phenomena in the earth. Many studies in tectonophysics bear heavily on offier disciplines auch as structure and composition of the earth's Interior, and vise-versa.

Theoretical and experimental models presently play a major role in understanding convection in the earth, whereas new observa-tional techniques have been crucial in better. defining the relative importance of vertical vs. horizontal dolormation in the lithosphere. A common substance on earth, HaO, is probably important if not critical for many tectonophysical disciplines, namely, rock strengths. strain rates, heat flow, etc. Increased opportunities for contact and communication with our colleagues in physical chemistry and hy-trology will probably help resolve many out-standing problems here.

"New lechniques of observation and meadrement are likely to contribute to signifi-

AGU (cont. on p. 590)

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cances in tectonophysics in the near can twances in tectonophysics in the near future. Deep reflection profiling on both continues and oceans (e.g., COCORP, BIRPS) profite important third dimension in the most futle part of the crust. Deep drilling, also oth as sea and on land, gives us the necessary "ground truth" after geophysical surveys and other remote sensing, and also the access to in give experiments at death. When access to in situ experiments at depth. When long-team seismometer networks become feasible to emplace at sea, perhaps in horeholes, advances in understanding place structure and tectonics of place boundaries may be comparable to the advances in tectualophysics realized after installation of the world-wide seismie network. Finally, observations from satellites should continue to expand from their promising heginnings, with studies ranging from refinement of the geoid, definition of susface tectonics in remote areas, and perhaps even real-time measurements of relaiive plate movements.

"Communication is important to most of us, not only within our own national horders, bot also with our colleagues abroad. Like all geological disciplines, tectunophysics is not di-vided along political boundaries, and we can learn much from fureign colleagues who enphasize different disciplines than our own na-tional programs. Pasticularly in times of difficult pulitical situations, AGU's private status and its commitment to international cooperation can be used to keep us better informed. For example, the experience over the past several years in the USSR in drilling superdeen holes on land for scientific purposes should certainly be studied as thoroughly as passible before similar attempts are launrhed in the U.S. or other countries. Some of the limited resources of the AGU could be used to enhance scientific communications between U.S. and foreign scientists. If elected, I would be receptive to explain more effective ways in which AGU can foster direct communications (visits, meetings) with foreign scientists, when appropriate to advance understanding of tec-numphysical problems."

Tectonophysics: Secretary

member of AGU since 1973; 34 years old. Associate professor of geophysics in the Department of Earth and Planetary Sciences, MIT. Primary research interests are in the fields of marine geophysics and tectonics, especially the use of marine geophysical observations to elucidate dynamical processes within the earth. B.A., theoretical physics, 1969, and Ph.D., geophysics, 1973, from the University of Cambridge; at MIT since 1973. Published 21 articles, including 11 in AGU journals. Recent publications include: Causes and consequences of the relation between area and age of the ocean floor, IGR, 87, 289, 1982, and The relationship between surface topography, gravity anomalies, and temperature structure of convection, JGR, 88, 1129, 1983.

Wayne Thoteher A member of AGU since 1968; 40 years old. Geophysicist, U.S. Geolugical Survey. Major interests: earthquake mechanism and crustal tional seismology. B.Sc. (Honors), physics and geology, McGill Univer-

sity, 1964; Ph.D., seismology, Caltech, 1971 Research genphysicist at U.S. Geological Survey, Menlo Park, Calif., 1971-present. Member SSA. Member, NAS/NRC Committee on Geodesy. 35 publications, 19 in AGU journals, including Source parameters of southern Califurnia earthquakes (with T.C. Hanksi, 1973: Strain accumulation and release mechanism of the 1906 San Francisco earthquake, 1975; Systematic inversion of geodetic data in central California, 1979. Associate editor, Geophysical Research Letters, 1976-1978; associate editor. Journal of Geophysical Rysearch, 1980-present

7

<u>Meetings</u>

New Listings

A boldface meeting title indicates spousorship or cosponsorship by AGU.

June 18-22, 1984 Fifth International Conference on Finite Elements in Water Resources, Burlington, Vt. Sponsors, University of Vermont, AGU. (J. P. Laible, Dept. of Civil Engineering and Mechanical Engineering, Univ. of Vermont, Burlington, VT 05405; (el.: 802-656-3800.)

June 25-July 7, 1984 Committee on Space Research (COSPAR) 25th Meeting Graz, Austria. (Richard C. Han, Space Science Board, JH-828, National Academy of Sciences, 2101 Cuastitution Avenue, N.W. Washington, DC 20418.)

The complete Geophysical Year last appeared in the August 30, 1985, Ess.

Nominations for Medals and Awards

William Bowle Medal. Awarded for | of outstanding ability. Recipienis must outstanding contributions to fundamental geophysics and for unselfish cooperation in research.

Maurice Ewing Medal. Honors an Individual who has led the way in understanding the physical, geophysical, and geological processes in the ocean; who is a leader in ocean engineering, technology, and instrumentation; or who has given distinguished service to the manne sciences. Robert E. Horton Medal. Given for outstanding contributions to the geo-

physical aspects of Hydrology.

James B. Macelwane Awards. Up to three awards are given each year for significant contributions to the geophysical sciences by a young scientist

be less than 36 years old.

Letters of nomination outlining significant contributions and curriculum vitae shunid be sent directly to the appropriate commiltee chairmen: Bowie Medal - Engene M. Shoemaker U.S. Geological Survey, 2255 Genlei Drive, Flagstaff, AZ 86001; Ewing Medal - Robert O. Reid, Department of Oceanography, Texas A&M University, College Station, TX 77843; Horton Medal - R. Allan Freeze, Department of Geological Sciences, University of British Columbia, Vancouver, B.C., Canada V6T 1W5 Macelwane Award - I. Freeman Gilbert IGPP A-025, University of Californial San Diego, La Jolla, CA 92093.

Deadline for Nominations is November 1, 1983.

Separates

To Order: The order number can be found as the end of each abstract; use all digits when ordering. Only papers with order numbers are available from AGU. Cost: \$3.50 for the first article and \$1.00 for each additional article in the same order. Paymens muss accompany order. Deposit accoons available.

> Send your order to: American Geophysical Union 2000 Florida Avenue, N.W. Washington, D.C. 20009

Exploration Geophysics

(920 Electrical listhods TRANSTERT ELECTROPAGETIC PESPONSE FROM A TREM DAYE IN THE EARTH THE EARTH
A. Q. Novard Jr., fficesrical & Computer Engineering
Department, University of Arizons, Tucson, AZ 83721), K.

Rabulsi

An alectromagnetic solution for a thin tabular conductor in a lossy modium is presented. This is an atension of "Mescell's Theorem". Both impulsive and time harmonic electric line sources are analyzed. The orientation of the source is parallel to the sheet conductor. This assumption renders the problem two-disensional. The solution and associated analytical ramits have application to gapphysical probing. For example, the shoet can model a conducting ore dyke or effluid filled crack in an induction logging application. Transtent numerical results are usen to be diagnostic of the conductivity thickness product W = rd. [Electronagnetic, transient reasonas, mailytical results.]



ABSTRACT DEADLINE: February 22, 1984

For more information or to tie placed on a special mailing list, write to 1984 Spring Meeting, AGU, 2000 Florida Avenue, N.W., Washington, DC

> Cali for Papers to be published: In **Eos**, November 15, 1983.

0920 Magnetic and electrical methods thttgratiom of coologic, GBOCOMMICAL, AND CROPEYBICAL DATA OF TEE CEMENT OIL PIECO, OKLAHOMA, USING SPETINL

ARRAY PROCESSING
Patricia Termain Eliason (U.S. Coological Survey,
Plagmath AND Baryles Center, 2235 North Gaslaí Orlve,
Plagmath AN 86001] Terrence J. Godoven, and Pat B.

Plagataff, AK 86001 Terrence J. Gooden, and Pat D. Chavas, Jt.
Goologic, geochemical, and geophysical measurements were made at the Causant oil field, Oljahoma, test site using airborns and apareborns sensors coupled with ground-based data collaction. The data collaction is also data collaction of the collaction of t

studies.

Each data set was transformed loto a rectangular array covering approximately 0.3 dagress of latitude and loogitude, with each yloture element encompassing 36 m². Bersuss wost warishine only sparsely populate the raw large erray [l.a., Ilight line detail, the data ware loterpolated and smoothed using spatial Yiltering tachingss to construct continuous langes. The individual data sets were displayed as black and white continuous tons langes, color coded to Yerm color contour maps, or wellpalated to generate shaded-ralis!

contour maps, or wealpointed to generate shadad-ralls models.

Mathods for cottelet(on and date interpretation were systematically investigated by using all available sources. Tredstermation if prior houvladge" cotrelation estatistical was used to establish grounds for correlation and better define the limits of the date. This flut of date manipulation provided as enhanced pictorial representation of the gasologie, genchemical, and geophysical anomalies previously documented at Camagot.

GEOPHYSICS, VOI. AD. NO. 10

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Gayson-RAY LOGGING

J.G. Webl (Echlumbargar-Doll Ramarch, P.B. Sox 557, Sidga Haid, CT 0687) Donossed

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Geochemistry

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Trend Analysis, Washingion China reity, Smiat Louis, MC
63150), David E. Pallareon, and Villing E. Vilmon, dr.
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donswind of natropolitan Saint Louis asservation conditions. The contribution of this urban plums to
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atudy, nei succe asports recobad 2-3s10 g-sol/h, or
shost 3/2 mais per mole of smithed strogen, within
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ti is astimulate that bese sports ultimately reached
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Louis indicates that scihropogacio Inquis occubate
contural contributions in oscale and serosols for easter
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sainsious).
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A. Toonalsson and D. B. Enhalt
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not second 2.5 x 78° OS cm⁻². A nucher of possible
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180r. CR₂O, CR₂) were identified, and Oil concourtations as derived after correction for those letterlevenum (1f mecassery) are reported for 1979 through
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Hydrology

3168 Runofy and Strong low .

INPROVED NYSE ANY RELIANGETY MODEL FOR HYDRADLIC STRUCTURES.

Hen-Lio Los and Larry W. Maye (Department of Civil Seminaring, The University of Taxan, Austin, Tenas, 75712).

'Approved dynamic tink and rollegility socials based upon conditional probability distributions, are developed. The pay dynamic risk midel is

about to mare occupately reflect the overall its (probability or Yalture considering both hydrologic and testiculty encortaintiat of a leximally attracture. This denote risk model is also shown to have a close correspondence to requiremental methods for evaluating the expectation probability at a hydrologic event.

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Meteorology

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Particles and Fields-Interplanetary Space

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Simier, F. Kiltenreth, A. J. Krueger, and H. 1. Germ. Be rileity of ozane profile data from the satellita new DME was betted in a sortes of correlative reviews conducted of fire fived sites between 5% or 68% dring 1979-1980. The lotercoaparisons relact arten with alectrochemical ozone (ECC) billowesses and optimal management and optimal management and optimal management. By the several management of the profile of the control of the cont

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Pioneet | I high time resolution, ~ I donate observations eithin t 5 hours of certotating lotoraction
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5380 Solar wind places
CAUSE OF THO SOLAR WIND RESEO VARIATIONS: 11
6. Holosades [Gaophysical (natitute, University of Alanks, Valtheaks, Alanho 99701], T. Munchets [* on lasve from the Uspartment of Engineering Physics, Chubu (natitute of Technology, Ensugai, Alohi 467, Icana)

pin resection of Absosphere with Electromagnetic interferences of REMAN DEFRUENTION OF INFRANCE REDIANCES BERNER RESERVENCES FILIDS OF CHARLES CIOUS BERNER RESERVENCES FILIDS OF CHARLES CIOUS FILIDS IN A Melman Department of Natural Registry of Viscousia-Medison, 1225 West Dayton St., prime by of Viscousia-Medison, 1225 West Dayton St., prime harden and were absultaneously measured from some duri finishs over the eastern Pacific Ocean by sens of the saturan and vectors goodstriorary solities, the measurements were compared with the meltic of the antice of the characterized the clouds as sirt dreafer cylinders disposed randomly on a plane, at lack chains disposed to regular and in shiftcon prices areas. The data seem a compared to the resist chained and methanical part array of prior cylinders and special characterized on the arterial registric cylinder cylinders and spullicantly on the arterial registric cylinder cylinders are found that the observed cloud fields an attraction and acquired that the observed cloud fields are not register periodic arrays. However, the sense of such and place supposed that the chords are not disposed randomly atther. The implication of the measurements on the understanding of the transfer of bissed railmoss through bricken cloud fields is ordered.

J. Sephyl. Sec., Green, Paper 101529 Chubu (natitues of Tachnology, Easugai, Alohi 467, Japan)
The relation between the usiar wind speed [V] obsurved at the earth's distance and the intimulation of the same the same and the intimulation of the same and the intimulation outsel line on the so-called 'suarce satisme' of the sun, which is determined from the spherical harmonic smalysis of the line of sight component of the photospheele exameth field [hosbeen et al., 1921, is examined. (t is shown that the usiar wind speed 7 increases as | 1 | lusteness and that V does not depend on the hellographic letiods of the earth. This totation may be septemented by V(tm/s) = 405 + 47 isio 1 during the pasion between May 1976 and August 1977. The presence of such a isritudinal pasdient of V indicates that some of the results of the special varietions of Y observed at the narch are caused by the apatisi varietions of Y with respect to \(\lambda\) [solet wind).

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Particles and Fields-Ionosphere

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ORDINARY MOBE AMBORAL KILOMETRIC RADIATION - MITH
MARMONICS - ORDINATED N° ISIS I

E. F. Benson flaboratory for flacetary Atmospheres,
NASA/Goddard Spare Flight Context, Greenbelt, 40 20771)

1518 I topside-sounder receiver observations that
reveal examples of o-mode auroral Minestric radiation
(AWR) are presented. They correspond to locations
nataled of the low density source ration of luteries AWR
s-mode ecussion. The propagation modes are identified
by comparing the neutral radiation was cutoffs with the
local resonant and wass cutoff phenomena attempted by
the neutral transmitter. The o-mode AVR is the dominant
entsion in those regions of relatively high electron
density, but it is considerably weaker than the intense
s-mode AWR observed to extract from low density cavilies
above the survival regions. In addition to the fundamental u-mode, 2ml and 3rd berronic benden of radiation have
also hom detected. These harmonics associated with omode AWR are less intense than the harmonics associated
with v-mode AWR. It is difficult to explain the vertely
of harmonic AWR observations (q as well as o-mode) hased
up present AWR theories.

End. < cl., Paper 181430)

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meter have been made with the STARE system (Stendiewive meter have been made of the mar radial Doppler valocities were asset to derive satisfacts of the ionespheric stattum drift velocity. The date were satisfact to determine the stattum drift velocity. The two spectral types, characterized as this seme scattering volume. The width of the broad spectral (up to ebout 1000 kg) can be at least three times true (up to ebout 1000 kg) can be at least three times that of the nerrow spectrue, Newrow spectra were sheared for both testal sed lorgs flow sellot, while broad spectral for both testal sed lorgs flow sellot, while broad spectra for both testal sed lorgs flow sellot, while broad spectra (green bearing observed only for larger flow sayles (typically years observed only for larger flow sayles (typically larger than 70°). Earrow spectra here a width makink le. intensitive to veriations of the flow engle and with increasing electron drift velocity. The width of the broad opectra, us the other hand, it were the sesse line of sight Coppler velocity secseds 350 to 460 ms. Those observations that the characteristic of the other stream sed gradiest-drift instabilities. (Radir surdra, spectra, sectric feids).

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posicid are estimated from geomagnetic dats for three seasons and the yearly average. The external current intensity ratio is summer over winter is 1.4-5.0 for the diutnal current, 1.3-3.7 for the sesiblicancy current, and 1.1-4.1 for the combined current of the lirst four berrousles. Also, the phase of the turest in local winter frequently shifts, to a large extent, relative to the yearly swarge current system. This amoustous heavier during soletical months, perticularly in winter, is caused by lunar risks wind variations. It is supparaised that the L current flows mainly at the ionospheric 3 region which is some as for the Eq rurrent.

J. Gusphys. Res., Dion, Paper 141424

5563 Place motion, convection, or cittuistion WILTH-OTATION MEASUREMENTS OF MIGH LATITUDE TOWOSPHERIC

MILTI-BRADON MEASURPHENTS OF MIGH LATITUDE TONOSPHERIC CONVECTION

R. A. Reells [Concar for Space Ociances, Physics Program, Dalv. of Towns at Delies, Sichnidgen, TX 71080), J. C. Poster, O. de la Beacystdera, and J. Rolt Derived ton drift nelocity measurements from the Miliatone Sill, Chatenika and State reduce and from the DE-2 satallita have been need to construct (netaminates pictures of the global high latitude convection pattern. (ci as show that for an interplanatory asgnatic field orinatation that is southward and way from the son, the two-call incompletic convection pattern is untremely supported with respect to the soco-midnight maridian. The dush convection call is sincet circular and estends beyond the non-midnight maridian to the dawn side where it is surrounded by a transact-shaped dawn cell. This configuration is a transcent-shaped dawn cell. This configeration : retained even when the north-mouth temperature of the interplanatory magnetic field is nary small.

Particles and Fields— Magnetosphere

5720 interscilons between celar wind and magnatoaphera A SURVET OF DAYSIDE TLUX IRMESER EVENTS ORSERVED BY ISEE I AND 2 MAGNETOMETERS.

R.P. Rijsbens (Bischell Laboratory, importal College, london SW7 20Z, U.K.), S. M. H. Cowley, B. J. Southwood and C. I. Russell.

We have made a survey of flax transfer events (FTE's) using magnatomator data from ISEE 1 and 2. Ma find theil they occur regnierly whom the magnatoshoeth field is southwerds bell out when it is northwards.

FTE's with an untward followed by an invard signature in the field component cernal to the agentopouse are proferentially seen at low or southward y lailtudes. Ouring periods of southward magnatoshoeth field is a sverage number (~5) and accurrance line (~6 meleus) of FTE's observed per magnatopause crossing in the magnatoshoeth is similar to the sverage number (~4) and accurrance time (~7 minates) of FTE's observed inisrior to the magnatopause. Me darlys slower limit of -5kV for the voltage associated with FTE magnatic flax removal during touthward fisid conditions but argue that this value may actually be up to an order of magnitude in riger. Ints would bring the voltage in live with the tray of the purposity observed proserved to the proposity of the proposity

J. Goophys. Gea., Blue, Paper JA1521

5716 Nagnetic Tall
COMPASISON OF AN ANALYTICAL APPROXIMATION FOR PARTICLE
HOTION IN A CUPRENT SERET WITH PRECISE NUMERICAL

CALCULATIONS
T.W. Spelmot instro-Coophysics Department, University
of Colorado, Soulder, Colorado, 80100), L.R. Lyons
Approximate analytic solutions exist for particle
motion in a one-dimensional current shest with a constant normal magnatic field component. These solutions
are lested against procise numerical calculations, and
a range of validity of the analytic solutions is inferred. For example, in the geomagnetic tail neutral
sheat, for a dawn-dush electric field of .1 to 1 may 1,
Tobu field all 01 of 04 nT, and sheet thickness of 1000
lon, the analytic solutions serve as a sood prudictor of
particle motion when the normal magnatic field compon-

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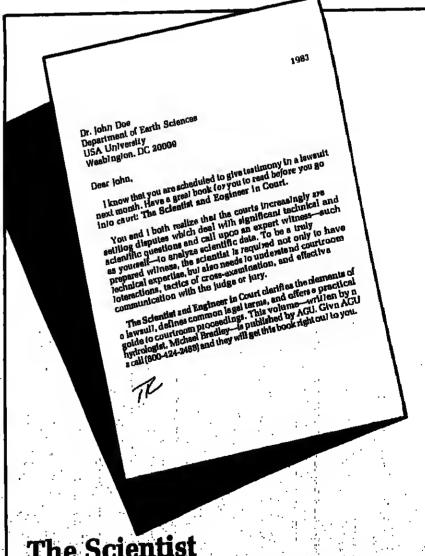
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ent is less than 1 or A of. Selog the enalytic solu-tions, initial distribution functions are supped (nto final jeccelerated) distributions, and the analytic asophops are compared with numerical suppluga-(Persicle solion, current sheece, electric fields, analytical approximation). J. Coophys. Ross. Blue, Paper 1ALADS

S755 Pisson Instablilities
CYCLOTROM MARK ENISSION OF AURORAL 2-MODE RADISTION
S. O. ROWICL' Deportures of Astro-Conspanies, University of Colorade, Rouldox, Colorade, SS109), O. S. Meltons (School of Physics, University of Sydney, Bydnoy, SSW, 2006, Australia) and G. A. Duik' (Olvision of Radiophysics, CS180, P.O. Sox 76, Epping, SSW, 2121, Australia) was the note that of the cyclotron masor unlawlon may be the methods generating the success s-mode radiation observed in regions where the places frequency; plais less than the cyclotron fragenese, no. Our calculation of the s-mode growth rares for so analytic con-sided less-come distribution indicate than: Il Growth occuse in a small creacest-shaped rogion of \$\omega\$ - 0 spoce just outside a Gorbidden some near \$O = 90° with \$\omega\$ between \$\Omega\$, and the apper hybrid frequency. [11] The temporal growth rate for the \$\omega\$ mode at than that for the unsuppressed and \$\omega\$ code but comparable with that of the o mode; for \$\omega\$, \$\omega\$ code but comparable with that of the a code is comparable with that of the a code; for \$\omega\$, \$\omega\$ code and the comparable with that of the a code; for \$\omega\$, \$\omega\$ because of the low growth of the stode and the code temperate with that of the a code giving it an advantage. (11) The product of the special growth tate to higher than the of the a code giving it an advantage. (11) The product of the special growth rate and the headwidth of the growing rawes for the scale is much greater than that of the o mode. (10) Although all grownerable with that for the funsuppressed of the scale is married as mode greater than that of the o mode. (10) Although all growing a-mode surves have slightly unpead directed were normals (0 2 90°), nost have downward directed were normals (0 2 90°), nost have downward directed awaye normals at angles 0 hetwess 10° and 70°, and a can propagate towards regions where \$\omega\$ and produced to Sydoay, BSW, 2006, Austral Le.

On lawayer from English of Astro-Geophysics, University of S



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